REMARKS

INTRODUCTION:

In accordance with the foregoing, claims 6 anad 12 have been canceled, and claims 1, 8, 10, 14, 16, and 19 have been amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-5, 7-11, and 13-21 are pending and under consideration. Reconsideration is respectfully requested.

REJECTION UNDER 35 U.S.C. §103:

A. In the Office Action, at pages 2-6, numbered paragraph 3, claims 1, 2, 8, 14, and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuji et al. (USPN 5,294,986; hereafter, Tsuji) in view of Quardt et al. (USPN 5,434,931; hereafter, Quardt). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

Independent claim 1 has been amended to include the features of claim 6. Claim 6 has been canceled without prejudice or disclaimer.

Independent claim 8 has been amended to include the features of claim 12. Claim 12 has been canceled without prejudice or disclaimer.

Independent claim 14 has been amended to include the terminology: "wherein the setting the contrast of the image signal includes calculating the cumulative distribution function of the calculated pixel values and re-configuring the cumulative distribution function based on a Formula as set forth below:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K$$

where N is a highest pixel value displayable when the image signal forms an image, and K denotes a pixel value."

Independent claim 19 has been amended to recite, in part: "...a CDF compensation unit, coupled to the CDF unit, to reconfigure the accumulated probability functions according to a predetermined luminance adjustment that reduces an influence on a total luminance of an output image due to luminance of predetermined portions forming the output image and convert the

image signal based on the Formula below with the cumulative distribution function of reconfigured pixel values:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K,$$

wherein N is a highest pixel value displayable of the image, and K denotes a pixel value."

As stated in its Abstract, recited below for the convenience of the Examiner, Tsuji teaches accumulation of data having an added calculated fixed value, and normalizes the data:

> A gradation corrector for use in a television receiver which can subject a signal at any luminance level to non-linear correction to provide optimum image quality. Memory stores therein luminance histogram of an input signal. On the basis of the data, a circuit detects a total frequency, a circuit detects luminance distribution, and a circuit detects the expanse of the luminance distribution. A circuit calculates a fixed value to be added. Further, a circuit detects a minimum luminance level, and a circuit detects an average luminance level. A circuit calculates an accumulation starting point and a circuit calculates an accumulation stopping point. An adder adds the calculated fixed value to the data in the memory. A circuit accumulates the results in the range from the accumulation starting point to the accumulation stopping point. The accumulation result is stored in memory. A circuit detects the maximum cumulative value, and a circuit normalizes all the data stored in the memory by use of this maximum value. The normalized data are stored in a memory. Thus, the input signal is subjected to optimum normalization by use of the normalized data. (emphasis added)

Thus, Tsuji fails to teach or suggest setting the contrast of the image signal including calculating the cumulative distribution function of the calculated pixel values and re-configuring the cumulative distribution function based on a Formula as set forth below:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K$$

where N is a highest pixel value displayable when the image signal forms an image, and K denotes a pixel value, as is described in amended independent claims 1, 8, 14, and 19 of the present invention. In fact, Tsuiji teaches away from the present invention by teaching an apparatus and a method of setting the contrast of an image signal which is different from the apparatus and method of the present invention.

As stated in its Abstract, recited below for the convenience of the Examiner, Quardt teaches density averaging a reduced range histogram and mapping to interface with a printer, hence transforming gray values of image data:

> A method of picture image processing, and system for carrying out same, involves generation of a composite mapping function, for transforming gray scale values to different values in order to enhance contrast. A reduced range histogram is generated,

involving removing a percentage of the total histogram counts from bottom and top sub-ranges and also removing spikes. The reduced histogram is then density averaged in order to obtain a first map function. A second map function is generated for interfacing with the characteristics of the printer to be used, and a composite mapping transform is generated by combining the two generated functions. After the composite mapping function is generated, each gray value of the image data set is transformed in accordance with the composite function, for use in printing, thereby providing an enhanced contrast image. (emphasis added)

Hence, Quardt fails to teach or suggest setting the contrast of the image signal including calculating the cumulative distribution function of the calculated pixel values and re-configuring the cumulative distribution function based on a Formula as set forth below:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K$$

where N is a highest pixel value displayable when the image signal forms an image, and K denotes a pixel value, as is described in amended independent claims 1, 8, 14, and 19 of the present invention. In fact, Quardt teaches away from the present invention by teaching an apparatus and a method of setting the contrast of image data which is different from the apparatus and method of the present invention.

Thus, the combination of Tsuji and Quardt teaches away from amended independent claims 1, 8, 14, and 19 of the present invention.

It is respectfully submitted that neither Tsuji nor Quardt, alone or in combination, teaches or suggests the cummulative distribution conversion unit of the present invention wherein the cummulative distribution conversion unit is a unit of a contrast compensation apparatus comprising: a pixel value detection unit to detect a distribution of pixel values of respective pixels of an input image signal; a pixel value limit unit having pre-set luminance limit values and being coupled to the pixel value detection unit, re-configuring the distribution of the pixel values of the respective pixels based on the pre-set luminance limit values; a mapping unit, coupled to the pixel value limit unit, to set a luminance of the respective pixels based on a cumulative distribution function with respect to the re-configured pixel values;and a cumulative distribution function conversion unit located between the pixel value limit unit and the mapping unit, converting the image signal based on the Formula below with the cumulative distribution function of pixel values re-configured in the pixel value limit unit:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K,$$

wherein N is a highest pixel value displayable when the image signal forms an image, and K

denotes a pixel value, as is recited in amended independent claim 1 of the present invention.

Similarly, neither Tsuji nor Quardt, alone or in combination, teaches or suggests amended claim 8 or 14 or 19 of the present invention.

Hence, it is respectfully submitted that amended independent claims 1, 8, 14, and 19 of the present invention are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931). Since claims 2-5, 7, 9-11, 13, 15-17, and 20-21 depend from amended independent claims 1, 8, 14, and 19, respectively, claims 2-5, 7, 9-11, 13, 15-17, and 20-21 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) for at least the reasons amended independent claims 1, 8, 14 and 19 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931).

B. In the Office Action, at pages 6-11, numbered paragraph 4, claims 3-5, 9, 10, 15, 16 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuji et al. (USPN 5,294,986; hereafter, Tsuji) in view of Quardt et al. (USPN 5,434,931; hereafter, Quardt) as applied to claims 2, 8, 14 and 19 above, and further in view of Schu (US 2002/0136464; hereafter, Schu). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

Independent claims 1, 8, 14, and 19 have been amended as set forth above.

It is set forth above that neither Tsuij nor Quardt, alone or in combination, teaches or suggests the cumulative distribution function conversion unit or corresponding method of the present invention, and thus do not teach or suggest amended independent claims 1, 8, 14, and/or 19 of the present invention.

Schu, as stated in paragraphs [0032]-[0033] of Schu, recited beow for the convenience of the Examiner, processes brightness values of pixels utilizing a first straight-line function having a first variable slope factor that is the first transformation function and the second transformation function that is a second straight-line function having a second variable slope factor, the first slope factor of the first straight-line function and the second slope factor of the second straight-line function being determined by an analysis of the transformed output image:

> 0032] According to the teachings of the present invention, the mean brightness is maintained (i.e., a pixel having a brightness corresponding to the mean brightness of the input image does not change its brightness upon application of the contrast enhancement). Additionally, straight-line functions having variable slope factors are used as the transformation functions, in which case the two straight-line functions intersect in particular at the mean brightness value x.sub.m and can be defined by the following

functions:

$f_L(x_k)=x_m+(x_k-x_m)*a_L|x_k \leq x_m$ (10)

$f_u(x_k)=x_m+(x_k-x_m)*a_U|x_k \geq x_m$ (11)

[0033] In this case, x_m denotes the mean brightness value, x_k denotes the respective brightness value to be processed of the sub-image X_L and X_U, respectively, a_L denotes the slope factor of the transformation function $f_L(x_k)$ and a_U denotes the slope factor of the transformation function $f_U(x_k)$. <u>The transformation function $f_L(x_k)$ is exclusively applied to the pixels of the sub-image X_L</u>, which only has pixels having brightness values less than or equal to the value of the mean brightness x_m ($x_k \leq x_m$). <u>Furthermore, the transformation function $f_U(x_k)$ is exclusively applied to the pixels of the sub-image X_U</u>, which only has pixels having brightness values greater than the value of the mean brightness x_m ($x_k \geq x_m$). With regard to the definition of the sub-images X_L and X_U, in order to avoid repetition, reference may be made at this juncture to the previous explanations with regard to the background art, since these apply analogously to the present invention. (emphasis added)

It is respectfully submitted that Schu also does not teach or suggest, and in fact teaches away from, the cumulative distribution function conversion unit or corresponding method of the present invention, and thus does not teach or suggest amended independent claims 1, 8, 14, and/or 19 of the present invention.

Hence, the combination of Tsuji, Quardt and Shu teaches away from amended independent claims 1, 8, 14, and 19 of the present invention.

Thus, amended independent claims 1, 8, 14, and 19 of the present invention are patentable under 35 U.S.C. §103(a) over Tsuij, Quardt, and Schu, alone or in combination. Since claims 3-5, 9, 10, 15, 16 and 20 depend from amended independent claims 1, 8, 14, and 19, respectively, claims 3-5, 9, 10, 15, 16 and 20 are patentable under 35 U.S.C. §103(a) over Tsuij, Quardt, and Schu, alone or in combination for at least the reasons amended independent claims 1, 8, 14, and 19 are patentable under 35 U.S.C. §103(a) over Tsuij, Quardt, and Schu, alone or in combination.

C. In the Office Action, at page 11, numbered paragraph 5, claims 3-5, 9, 10, 15, 16 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuji et al. (USPN 5,294,986; hereafter, Tsuji) in view of Quardt et al. (USPN 5,434,931; hereafter, Quardt) as applied to claims 1 and 8 above, and further in view of Kuo et al. (USPN 5,982,926; hereafter, Kuo). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

The reasons amended independent claims 1, 8, 14 and 19 are patentable over Tsuji, Quardt and Schu are described above.

Kuo sets forth first and second preferred embodiments for image enhancement in col. 3, line 60 through col. 4, line 23 and in col. 4, line 58 through col. 6, line 22, recited below for the convenience of the Examiner:

> Kuo, col. 3, line 60 through col. 4, line 23:
>
> A first transformation function is applied to the intensity values of the image to optimally utilize the available intensity value dynamic range of the video processing system. A second transformation function is applied to the saturation values of the image to optimally utilize the available saturation value dynamic range of the video processing system. The hue values of the original image are not changed. The purpose of the first transformation function is to allocate the dynamic range of intensity values provided by the video processing system to optimally correspond to the dynamic range of intensity values included in the original color image. The second transformation function allocates the dynamic range of saturation values provided by the video processing system to optimally correspond to the dynamic range of saturation values included in the original color image. (emphasis added)
>
> The first transformation function is a piece wise linear mapping function in two dimensions having three substantially linear regions defined by four intensity value points. A first dimension represents intensity input values (i.e., intensity values included in an image to be processed), and a second dimension represents intensity output values (i.e., optimized intensity values for the enhanced image). A first intensity value point is represented by the minimum intensity value in a given image, a second intensity value point is represented by the maximum intensity value in this image, and the third and fourth intensity value points are selected to be between the first and second intensity value points. Selection of specific values for the third and fourth intensity value points are determined by the extent to which a given image is under- or over-exposed. (emphasis added)
>
> Kuo, col. 4, line 58 through col. 6, line 22:
>
> FIG. 1 includes an identity mapping function 103 which will be discussed hereinafter in connection with the second transformation function and image saturation values. (emphasis added)
>
> With reference to FIGS. 2 and 3, specific calculations for vupper and vlower may be performed by developing an intensity value histogram for the image to be enhanced. Such an histogram divides the range of intensity values present in a given image, i.e., the range from vmin and vmax, into a plurality of sub-ranges. For each of the plurality of sub-ranges, the number of pixels in the image having intensity values in this sub-range is determined. The first moment of the histogram may be conceptualized as the "center of gravity" of the histogram. The "center of gravity, i.e. the first moment, may be calculated by using the formula

$$\begin{Bmatrix} \text{First} \\ \text{Moment} \\ \text{of} \\ \text{Histogram} \end{Bmatrix} = \frac{\sum_{i=1}^{N}(h_i * I_i)}{\sum_{i=1}^{N} h_i}$$

where I_i represents a specific intensity level, h_i is the number of pixels having intensity level I_i, and N is the total number of intensity levels (sub-ranges). For example, intensity level 301 (FIG. 3) may be conceptualized as representing intensity level one (I_1), intensity level 303 may be conceptualized as representing intensity level two (I_2), and intensity level 319 may be conceptualized as representing intensity level ten (I_{10}). In this example, there are ten intensity levels (i.e., ten sub-ranges), so N is equal to 10. (emphasis added)

FIG. 2 illustrates intensity components for an exemplary color image 207 comprised of a plurality of pixels 201, 203, and 205. Each pixel 201, 203, 205 is associated with a specific value representing the intensity component for that pixel. For example, pixel 201 is white, which may be defined as representing a relatively low value of intensity. In this manner, pixel 205, in black, represents a relatively high value of intensity, and pixel 203, in diagonal cross-hatching, represents an intermediate value of intensity with respect to pixels 201 and 205.

FIG. 3 is an intensity value histogram showing the relative distribution of intensity components for the color image 207 of FIG. 2. The intensity value histogram shows the number of pixels in a given image that have specific intensity values. The y-axis, labelled in "number of occurrences", is in units of pixels, and the x-axis represents intensity levels. In the example of FIGS. 2 and 3, ten different intensity values are employed to represent the pixel intensity values of the image. With reference to FIG. 3, the lowest intensity value is represented by intensity value 301 (shown in white), intermediate intensity values are represented by intensity values 303, 305, 307, 309, 311, 313, 315, and 317, and the highest intensity value is represented by intensity value 319 (shown in black). From the intensity value histogram of FIG. 3, it is observed that the color image 207 includes 48 pixels having intensity value 301, 14 pixels having intensity value 303, 22 pixels having intensity value 305, etc. The first moment of the intensity histogram is the intensity value including the greatest number of pixels which, in the present example, is intensity value 301 having a total of 48 pixels.

The first moment of the intensity value histogram provides an indication as to the relative over- or under-exposure of a given image. The first moment is closer to vmin (FIG. 1) for an underexposed image, and closer to vmax for an overexposed image. Based upon the first moment of the intensity value histogram (FIG. 3), two intensity levels, vlower and vupper, are calculated such that, as the first moment becomes increasingly closer to vmin, vupper increases and vlower decreases. As the first moment becomes increasingly closer to vmax, vupper decreases and vlower increases.

Let the full dynamic range of the video processing system be given by [VMIN, VMAX], where VMIN and VMAX correspond to the minimum and maximum intensity values capable of being represented in a given video processing system. In the case where a video processing system consists of a video display device, VMIN and VMAX are selected to correspond to the minimum and maximum intensity values capable of being displayed. Intensity values between vmin and vlower are mapped linearly to the range [VMIN, VLOWER], where VLOWER=VMIN+{(vlower-vmin)/3}. Intensity values between vlower and vupper are linearly mapped to the range of [VLOWER, VUPPER], where

> VUPPER=VMAX-{(vmax-vupper)/3}. Intensity values in the range [vupper, vmax] are linearly mapped to the range [VUPPER, VMAX]. Note that the denominators of the equations for VUPPER and VLOWER include a value of 3. This value is shown for illustrative purposes. Values differing somewhat from 3 may be employed such as, for example, 2.5 or 3.7. Moreover, a different value (i.e., 4.0) may be employed in the denominator of VUPPER, relative to the value employed in the denominator of VLOWER (i.e., 2.3).
>
> The mapping of the intensity values as described in the immediately preceding paragraphs permits proper allocation of the dynamic range of a given video processing system to the actual range of intensity values present in an image to be enhanced.

It is clear that Kuo teaches allocating the dynamic range of intensity values provided by the video processing system to optimally correspond to the dynamic range of intensity values included in the original color image wherein the first transformation function is a piece wise linear mapping function in two dimensions having three substantially linear regions defined by four intensity value points such that a first dimension represents intensity input values, and a second dimension represents optimized intensity output values and four intensity values are determined. The second transformation function of Kuo allocates the dynamic range of saturation values provided by the video processing system to optimally correspond to the dynamic range of saturation values included in the original color image utilizing a first moment of the histogram that is calculated as the "center of gravity" of the histogram wherein, based upon the first moment of the intensity value histogram (FIG. 3), two intensity levels, vlower and vupper, are calculated such that, as the first moment becomes increasingly closer to vmin, vupper increases and vlower decreases, and as the first moment becomes increasingly closer to vmax, vupper decreases and vlower increases. In Kuo, intensity values between vmin and vlower are mapped linearly to the range [VMIN, VLOWER], where VLOWER=VMIN+{(vlower-vmin)/3}, and intensity values between vlower and vupper are linearly mapped to the range of [VLOWER, VUPPER], where VUPPER=VMAX-{(vmax-vupper)/3}. Intensity values in the range [vupper, vmax] are linearly mapped to the range [VUPPER, VMAX]. Although the denominators of the equations for VUPPER and VLOWER include a value of 3, values differing somewhat from 3 may be employed such as, for example, 2.5 or 3.7. In addition, a different value (i.e., 4.0) may be employed in the denominator of VUPPER, relative to the value employed in the denominator of VLOWER (i.e., 2.3). Hence, Kuo teaches away from utilizing a cumulative distribution function conversion unit or corresponding method of the present invention, teaches away from the present invention, and thus does not teach or suggest amended independent claims 1, 8, 14, and/or 19 of the present invention.

Hence, the combination of Tsuji, Quardt, and Kuo teaches away from amended independent claims 1, 8, 14, and 19 of the present invention.

Thus, it is respectfully submitted that amended independent claims 1, 8, 14, and 19 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) as applied to claims 1 and 8 above, and further in view of Kuo et al. (USPN 5,982,926), alone or in combination. Since claims 3-5, 9, 10, 15, 16 and 20 depend from amended independent claims 1, 8, 14, and 19, respectively, claims 3-5, 9, 10, 15, 16 and 20 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) as applied to claims 1 and 8 above, and further in view of Kuo et al. (USPN 5,982,926), alone or in combination, for at least the reasons amended independent claims 1, 8, 14, and 19 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) as applied to claims 1 and 8 above, and further in view of Kuo et al. (USPN 5,982,926), alone or in combination.

D. In the Office Action, at page 12, numbered paragraph 6, claims 11 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Tsuji et al. (USPN 5,294,986; hereafter, Tsuji) in view of Quardt et al. (USPN 5,434,931; hereafter, Quardt) and Schu (US 2002/0136464; hereafter, Schu) as applied to claims 10 and 16 above, and further in view of McCaffrey (USPN 5,949,918; hereafter, McCaffrey). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

The reasons amended independent claims 8 and 14 are patentable over Tsuji, Quardt and Schu are described above.

McCaffrey teaches a histogram equalization method wherein the need to perform division operations is removed by constraining the number of samples CDF(255) in a sample frame to 65535, as is recited in McCaffrey, col. 4, lines 14-56, recited below for the convenience of the Examiner:

> A histogram equalization method utilized by the invention will now be described. In histogram equalization, from the raw histogram (e.g., FIG. 3A), a cumulative distribution function (CDF) is calculated which represents the total number of sampled pixels at or below a bin (i.e., intensity level) currently being examined. The CDF function may be mathematically shown below as equation 1: (emphasis added)

$$CDF(N) = \sum_{j=0}^{N} his(j) \qquad \text{(eq. 1)}$$

The last CDF data point (i.e., the N[th] point) represents the total number of sampled pixels. Each non-zero bin is then mapped by dividing the CDF of the non-zero bin by the final (i.e., N.sup.th) CDF value and scaled appropriately to the display dynamic range (8-bits, or 256 levels in the example). The scaling operation is shown below as equation 2:

$$Vid_{out}(N) = 255 \cdot \left(\frac{CDF(N)}{CDF(255)}\right) \qquad \text{(eq. 2)}$$

Since division operations in hardware are time consuming tasks (e.g., typically taking 10 to over 100 instruction cycles to perform), it is desirable to reduce or remove the need to perform division operations. The floating point divide operation of equation 2 may be removed by constraining the number of samples CDF(255) in a sample frame to 65535. With this constraint, the equation 2 is reduced to equation shown below as equation 3: (emphasis added)

$$Vid_{out}(N) = \frac{255}{65535} \cdot CDF(N) = (CDF(N) \gg 8) \qquad \text{(eq. 3)}$$

The operation performed by equation 3 is reducible to a single instruction cycle operation (i.e., rotate right 8 positions) on a typical microprocessor or digital signal processor (DSP). Thus, the controller 140 may perform relatively rapid processing of subsampled data without using floating point or divide operations. As previously noted, this allows the use of an inexpensive DSP or microprocessor. (emphasis added).

In contrast, in amended independent claims 1, 8, 14, and 19 of the present invention, the cummulative distribution function of pixel values utilizes a division function, show below:

$$CDF(K) = CDF(K) - \frac{CDF(N)}{N \times K} + K \, .$$

Hence, McCaffrey teaches away from the present invention.

Thus, the combination of Tsuji, Quardt, Schu and McCaffrey teaches away from amended independent claims 1, 8, 14, and 19 of the present invention.

Hence, , it is respectfully submitted that amended independent claims 1, 8, 14, and 19 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) and Schu (US 2002/0136464) as applied to claims 10 and 16 above, and further in view of McCaffrey (USPN 5,949,918). Since claims 11 and 17 depend from amended independent claims 8 and 14, claims 11 and 17 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931) and Schu (US 2002/0136464) as applied to claims 10 and 16 above, and further in view of McCaffrey (USPN 5,949,918) for at least the reasons amended independent claims 8 and 14 are patentable under 35 U.S.C. §103(a) over Tsuji et al. (USPN 5,294,986) in view of Quardt et al. (USPN 5,434,931)

and Schu (US 2002/0136464) as applied to claims 10 and 16 above, and further in view of McCaffrey (USPN 5,949,918).

ALLOWABLE SUBJECT MATTER:

In the Office Action, at page 13, claims 6, 12, and 21 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 18 was allowed.

Applicants thank the Examiner for his careful review of the claims and allowance of claim 18.

In view of the above arguments and amendments, it is respectfully submitted that claims 1-5, 7-11, 13-17 and 19-21 are in allowable form.

EXAMINER'S RESPONSE TO ARGUMENTS:

In the Office Action, at pages 14-15, the Examiner presented his response to arguments presented by Applicants in the Amendment of May 8, 2007.

In view of the above arguments and amendments, it is respectfully submitted that the Examiner's concerns have been overcome.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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